N° 16,655 A.D. 1905

Date of Application, 16th Aug., 1905
Complete Specification Left, 16th Mar., 1906—Accepted, 3rd May, 1906

PROVISIONAL SPECIFICATION.

"Improvements in or relating to Wireless Telegraphy."

We, Guglielmo Marconi, D.Sc., LL.D., and Marconi's Wireless Telegraph Company, Limited, both of 18 Finch Lane, in the City of London, do hereby declare the nature of this invention to be as follows:—

The object of this invention is to provide improved apparatus for use in wireless telegraphy, whereby the efficiency of the apparatus can be largely increased, 1st, by limiting the receptivity of the receiver to electric influences coming in a certain assigned direction only, and 2nd, by eliminating from the receivers the undesired and disturbing effects of atmospheric or other electric waves.

The invention is based on the discovery that a horizontal wire having a length equal to one half the wave length sent out by the transmitter if laid parallel to the earth but insulated from it has electric oscillations set up in it only when it is placed substantially in a radial direction with respect to the transmitting centre and also is quite unaffected by atmospheric electrical disturbances.

According to this invention in place of an earth connection and an elevated conductor at the receiving end, we employ an insulated or practically insulated conductor lying in a horizontal or substantially horizontal straight line, preferably raised above the surface of the ground or water. The said conductor is divided into two parts preferably at the centre, and between the two parts is placed and connected any suitable receiver or detector of electrical waves, such as a magnetic receiver.

It is found that such a receiver is practically only operated by oscillations produced at a station situated in the continuation of the straight line of the receiving wire.

The high frequency electric wave transmitter we employ is one consisting of a long horizontal conductor in a line with the receiver, as described in our Provisional Specification dated the 14th. of July 1905 No. 14788.

When using the above described horizontal antenna as a receiver, it is desirable that the total length of its two parts should be approximately half a wave length of the transmitted oscillations, or its length may be half a wave length multiplied by an odd number, and several conductors laid side by side and connected together may be advantageously employed.

If the conductors should not be of the desired lengths they can be tuned to respond to the desired frequency by the introduction of suitable amounts of inductance or capacity or both.

As the receiver will give the strongest effects only when placed in a radial position as regards the transmitting centre it may be used with great advantage to determine the direction of a transmitter, such as for instance on a ship at sea.

The transmitting and receiving antennae above described may be completely insulated from earth, or they may under some circumstances be connected to earth through suitable choking coils or resistances which will prevent any undue accumulation of tension caused by atmospheric electricity.

The antenna may also be connected to the spark gap or detector as the case may be through condensers or inductances, in fact any of the usual adjuncts to the vertical aerial or antenna may be used.

[*Price* 8*d*.]

BIRMINGHAM FREE LIBRARIES

Two slanting or vertical wires may be employed to connect the detector to the two horizontal or substantially horizontal conductors when these are placed at a height above the earth.

Dated this 16th. day of August 1905.

G. MARCONI,
MARCONI'S WIRELESS TELEGRAPH CO. LTD.,
By G. Marconi,
Director,
S. Flood Page,
Henry S. Saunders,
Directors.
Henry W. Allen,
Secretary.

COMPLETE SPECIFICATION.

"Improvements in or relating to Wireless Telegraphy."

We, Guglielmo Marconi, LL.D., D.Sc., and Marconi's Wireless Telegraph Company, Limited, both of 18 Finch Lane, in the City of London, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The object of this invention is to provide improved apparatus for use in wireless telegraphy, whereby the efficiency of the apparatus can be largely increased, 1st, by limiting the receptivity of the receiver to electric influences coming in a certain assigned direction only, and 2nd, by eliminating from the receivers the undesired and disturbing effects of atmospheric or other electric waves.

The invention is based on the discovery that a horizontal wire, having a length equal to one half the wave length sent out by the transmitter, if laid parallel to the earth but insulated from it has electric oscillations set up in it only when it is placed substantially in a radial direction with respect to the transmitting centre and also is quite unaffected by atmospheric electrical disturbances.

According to this invention in place of an earth connection and an elevated conductor at the receiving end, we employ an insulated or practically insulated conductor lying in a horizontal or substantially horizontal straight line, preferably raised above the surface of the ground or water. The said conductor is divided into two parts preferably at the centre, and between the two parts is placed and connected any suitable receiver or detector of electrical waves, such as a magnetic receiver.

It is found that such a receiver is practically only operated by oscillations produced at a station situated in the vertical plane passing through the receiving antenna.

The high frequency electric wave transmitter we employ is one consisting of a long horizontal conductor in the same vertical plane as the receiver and preferably arranged with its generator end the nearer to and its tail end farther from such receiver, as described in our Specification dated the 14th of July 1905 No. 14788.

When using the above described horizontal antenna as a receiver, it is desirable that the total length of its two parts should be approximately half a wave length of the transmitted oscillations, or its length may be half a wave length multiplied by an odd number, and several conductors laid side by side and connected together may be advantageously employed.

If the conductors should not be of the desired lengths they can be tuned to respond to the desired frequency by the introduction of suitable amounts of inductance or capacity or both.

As the receiver will give the best results only when placed in a radial position as regards the transmitting centre it may be used with great advantage to determine the direction of a transmitter, such as for instance on a ship at sea.

The receiving antenna above described may be completely insulated from earth, or may under some circumstances be connected to earth through suitable choking coils or resistances which will prevent any undue accumulation of tension caused by atmospheric electricity.

The antenna may also be connected to the spark gap or detector as the case may be through condensers or inductances, in fact any of the usual adjuncts to the vertical aerial or antenna may be used.

Figures 1 and 2 are a diagrammatic elevation and plan respectively of transmitting and receiving stations at a considerable distance apart and equipped with horizontal transmitting and receiving antennae as above described. In these figures the transmitting station is on the left, *a* being the horizontal antenna which is connected to the earth *e* at its generator end, a pair of spark balls *b* being inserted in the earth connection and these are shown as usual connected directly to an induction coil *c*, but in place of the spark balls an inductance may be inserted or the coil of an oscillation transformer so as to create in the antenna *a* electric oscillations by inductive action in the usual manner.

In correspondence with this transmitting station is the receiving station on the right in which *d* is the horizontal receiving antenna divided into two parts each connected to the detector *f*.

Two slanting or vertical wires *g* may be employed to connect the detector to the two parts of the antenna *d* when these are placed at a height above the earth.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is;—

1. In a system of wireless telegraphy a substantially horizontal receiving antenna, divided into two parts each connected to a detector between them in correspondence with a substantially horizontal transmitting antenna in the same vertical plane substantially as described.

2. In a system of wireless telegraphy a substantially horizontal receiving antenna, divided into two parts each connected to a detector between them, in correspondence with a substantially horizontal transmitting antenna in the same vertical plane and having its generator end nearer to the receiver than its tail end substantially as described.

Dated this 15th. day of March 1906.

G. MARCONI,
MARCONI'S WIRELESS TELEGRAPH CO. LD.,
By Carpmael & Co.,
Agents.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1906.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

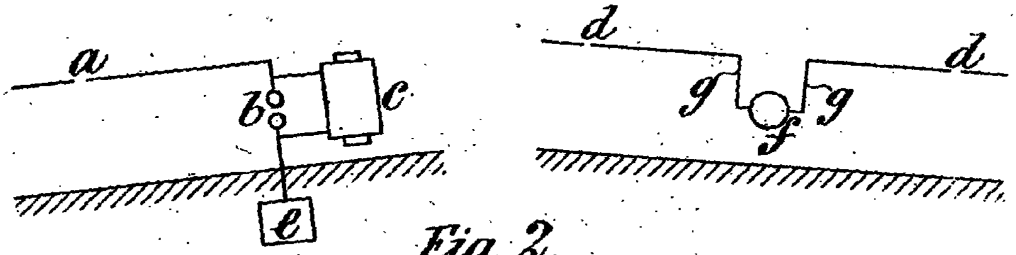
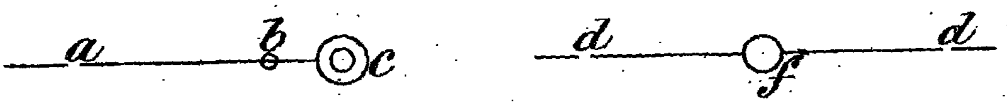


Fig. 2.



BIRMINGHAM FREE LIBRARIES

Malby & Sons, Photo.